REMARKS

The Application has been carefully reviewed in light of the Office Action dated August 28, 2002 (Paper No. 5). Claims 1 to 3 and 5 to 7 are in the application, of which Claim 1 is the sole independent claim. Reconsideration and further examination are respectfully requested.

The Abstract was objected to for containing legal phraseology. The Abstract has been amended to remove legal phraseology.

Likewise, the specification was objected to for informalities. The specification has been amended to attend to the informalities. Accordingly, withdrawal of the objections to the abstract and the specification is respectfully requested.

Claim 4 was rejected under 35 U.S.C. § 112, first paragraph as allegedly containing subject matter which lacked enablement. Claim 4 has cancelled and the substance thereof incorporated into Claim 1. In making this amendment, the concerns voiced in this § 112 rejection have been addressed so that the claim language conforms more closely to the disclosure.

Claims 1 to 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,080,927 (Johnson) in view of U.S. Patent No. 6,147,295 (Mimura) or in view of U.S. Patent No. 4,555,586 (Guha). The rejection is respectfully traversed.

According to Claim 1, the present invention concerns a solar power generation system comprising at least a solar cell and a cooling mechanism. The cooling mechanism has a cooling means for cooling the solar cell and a memory-and-operation means for memorizing or operating an optimum cooling and driving state of the cooling

means with respect to an output of the solar cell. The memory-and-operation means comprising a clocking function and previously determined standard temperature values for an atmosphere where the solar cell is installed for every one of predetermined time points of the year. The cooling means is driven in accordance with the standard temperature value from the memory-and-operation means at a time point at the installation location of the solar cell.

Thus, according to one feature of the invention, the cooling means is driven in accordance with the previously determined standard temperature values for the atmosphere where the solar cell is installed. This feature of the invention is advantageous over conventional systems since it permits operation that is tailored to local temperatures.

The applied art, taken either alone or in combination, is not seen to teach or suggest this feature of the invention. Johnson is merely seen to disclose a solar concentrator for producing usable power as heat or electricity which uses a self-steering heliostat to concentrate solar radiation onto an absorbing surface. As noted in the Office Action, Johnson controls cooling based on the temperature of the solar cells at the instant time. Thus, Johnson is not seen to rely on a standard temperature value from memory-and-operation means which has previously determined standard temperature values for every one of predetermined time points of the year.

Neither Guha nor Mimura compensates for the deficiency of Johnson. Guha is seen to disclose a photovoltaic device in which light induced defects may be removed by annealing the affected surface at relatively low temperature. Guha is not seen to teach a cooling means that is driven in accordance with previously determined standard temperature values.

Mimura is seen to teach a sunlight energy conversion device that contains a photoelectric transducer and means for supplying heat to the photoelectric transducer through a flowing heating medium. Mimura is also not seen to teach or suggest a cooling means driven in accordance with previously determined standard temperature values.

In light of the foregoing, withdrawal of the § 103(b) rejection of Claim 1 is respectfully requested.

The remaining pending claims are each dependent from Claim 1 and are therefore believed patentable for the same reasons. Because each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In regards to a formal matter, the Examiner is respectfully requested to indicate that the art cited in the Information Disclosure Statement dated September 12, 2002, has been considered and made formally of record.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE ABSTRACT

A solar power generation system having a solar cell provided therein and which is provided with a cooling mechanism, characterized in that [said] the cooling mechanism has a cooling [means] system for cooling [the] said solar cell and a memory and operation [means] for memorizing or operating an optimum cooling and driving state of [said] the cooling [means] system with respect to an output of [said] the solar cell, wherein [said] the cooling [means] system is driven based on an output of [said] the memory and operation [means] system.

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A solar power generation system comprising at least a solar cell and a cooling mechanism,

said cooling mechanism having a cooling means for cooling said solar cell and a [memory and operation] memory-and-operation means for memorizing or operating an optimum cooling and driving state of said cooling means with respect to an output of said solar cell, [wherein said cooling means is driven based on an output of said memory and operation means.]

wherein said memory-and-operation means comprising a clocking function and previously determined standard temperature values for an atmosphere where the solar cell is installed for every one of predetermined time points of the year,

wherein said cooling means is driven in accordance with said standard temperature value from said memory-and-operation means at a time point at said installation location of the solar cell.

4. (Cancelled).

5. (Amended) The solar power generation system according to claim 1, wherein said solar power generation system has a power conversion means for the output of the solar cell and [the memory and operation] said memory-and-operation means is provided such that [the memory and operation] said memory-and-operation means is included in said power conversion means.

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE SPECIFICATION

Incidentally, in order for a solar cell to have a large output energy, it is important that the solar cell is made to have a large photoelectric conversion efficiency. Besides, it is important to contrive such that the generated energy of the solar cell is increased. In order to increase the generated energy of the solar cell, there is considered, for instance, a measure that the solar cell is maintained at a temperature which is as low[er] as possible. Specifically, in the case where the solar cell is installed outdoors, when the solar cell receives direct sunlight, the temperature thereof is risen, where there is a phenomenon in that the effective power generation efficiency of the solar cell is reduced due to the temperature rise in comparison with that when the solar cell is maintained in a rated state (where the solar cell is maintained at 25°C). In order to prevent occurrence of this phenomenon, it is necessitated that the solar cell is maintained at a temperature which is as low[er] as possible. In the case where the solar cell is exposed to direct sunlight in summer time, the temperature of the solar cell generally reaches 80 °C or more, where when the solar cell is a silicon series solar cell (such as a crystalline silicon series solar cell or an amorphous silicon series solar cell), the temperature coefficient of the photoelectric conversion efficiency thereof is about -0.4 %/°C (which is meant that the absolute value of the photoelectric conversion efficiency is reduced by about 0.4 % per a temperature rise of 1 °C) and because of this, the power generation efficiency thereof is reduced by more than 20%. Therefore, even when a silicon series solar cell having a sufficiently high photoelectric conversion efficiency should be used, unless the silicon series solar cell is adequately cooled, it is difficult

for the solar cell to achieve a satisfactory power generation efficiency. Further, in the case where the solar cell is maintained at a relatively high temperature, heat load to the components thereof is increased and accordingly, the durability of the solar cell is deteriorated. Also in view of preventing the durability of the solar cell from being deteriorated, particularly in the case where the solar cell is installed outdoors, it is necessary to cool the solar cell so that the solar cell can be maintained at a temperature which is as low[er] as possible.